

Dry Marsh Restoration Project

Introduction

The Montezuma Refuge is located in what was historically called the Montezuma Swamp. This vast area extended northward from Cayuga Lake almost to Lake Ontario. In the 19th century, most of this swamp was drained for commerce and transportation by the development of the Erie Canal, the New York State Barge Canal, and the dam at the north end of Cayuga Lake, all of which lowered the water table up to ten feet. The Civilian Conservation Corps constructed a dike around the Main Impoundment in 1938 to hold water and restore part of the marsh habitat that had once existed. A portion of this impoundment was higher than the rest of the area, and due to these hydrological changes, a “dry” marsh consisting of more than 900 acres and almost entirely of cattails (*Typha* sp.) formed.

The Main Impoundment was bisected by the New York State Thruway in 1953 forming two “dry” marshes – one in the northern portion of the Main Pool and the other in the southern portion of the newly formed May’s Point Pool. The Dry Marsh in the Main Pool was further degraded through ditching and farming. It was last farmed in 1979 and has since reverted to a contiguous stand of cattails and Phragmites. Researchers from the Rochester Institute of Technology conducted biological surveys in the Dry Marsh of the Main Pool from 2000 – 2002 and found a lack of avian, amphibian, and plant species diversity compared to the remainder of the Main Pool.

It has long been recognized that the Dry Marsh portion of the Main Pool requires restoration to increase productivity. Explosives (ammonium nitrate) were used to create a pond in 1959. Years later, a large Bucyrus dragline was used for thousands of hours to open up the habitat to no avail. Both these methods created temporary openings that filled in as the displaced muck slumped back in and cattails re-invaded.

In 2000, the Refuge restored a small portion of the Dry Marsh in order to address this issue. This 70-acre impoundment, known as the Millennium Marsh, was created through the construction of a dike to hold water to a higher level, resulting in a mix of more open water to emergent marsh. Waterfowl and wading birds have used this area regularly ever since. This method of building a dike to create deeper water habitat is not possible in the rest of the Dry Marsh due to the elevation of the Wildlife Drive and the Thruway. In addition, constructing a dike in the project area would result in filling of a portion of the dry marsh wetland and cutting off surface water flow from the rest of the Main Pool.

Methods

Due to the degree of habitat degradation in the Dry Marsh, it is necessary to create depressions to restore this area to high-quality wetland habitat, thereby creating a mix of emergent marsh and open water habitat that will improve biological diversity and productivity. Soils in the dry marsh consist of deep muck (Mr) with a depth range between 40” to 17’ (United State Department of Agriculture Soil Conservation Service 1972).

This project involves the creation of depressions in the northern 240-acre portion of the Dry Marsh immediately adjacent to the Refuge's Wildlife Drive and the NYS Thruway. These depressions will be created in an irregular pattern through the excavation of muck using tracked excavators and other earth moving equipment. The irregular pattern visually attracts wildlife and creates more edge/interspersion between open water and emergent vegetation (Map 1).

The finished bottom of all excavations would be approximately 6 to 36 inches lower than the managed water level of the Main Pool. A meandering channel would connect the newly created depressions to the rest of the Main Pool thus permitting water flow and water level management.

A minimum of 50% of the side slopes of the depressions would be at a grade of 6:1 (6 horizontal to 1 vertical) or flatter. Slopes as flat as 10:1 are preferable if possible. The remaining side slope area would have a grade of 3:1 or flatter. The connecting ditches would have side slopes of 2:1 or flatter. Excavated muck would be spread over two nearby fields (Wildlife Drive Inside and Outside Corner Fields, Map 2).

The project has been divided into two phases. Phase I involves the creation of three depressions and will provide approximately 26 acres of manageable habitat with the excavation and removal of approximately 188,760 cubic yards of material. Phase I will be evaluated to determine success of the project. Researchers from the Rochester Institute of Technology will conduct biological surveys to determine avian, amphibian, and plant species diversity and compare their results to the remainder of the Main Pool well as the Dry Marsh, pre-restoration.

If Phase I is deemed successful, Phase II will be implemented. Phase II involves the creation of five depressions and will provide approximately 48 acres of manageable habitat with the excavation and removal of approximately 464,640 cubic yards of material.

Construction will occur in the winter when the ground is frozen or in the summer following a spring drawdown when conditions are most favorable. It may continue through the year as long as logistically possible.

Conclusions

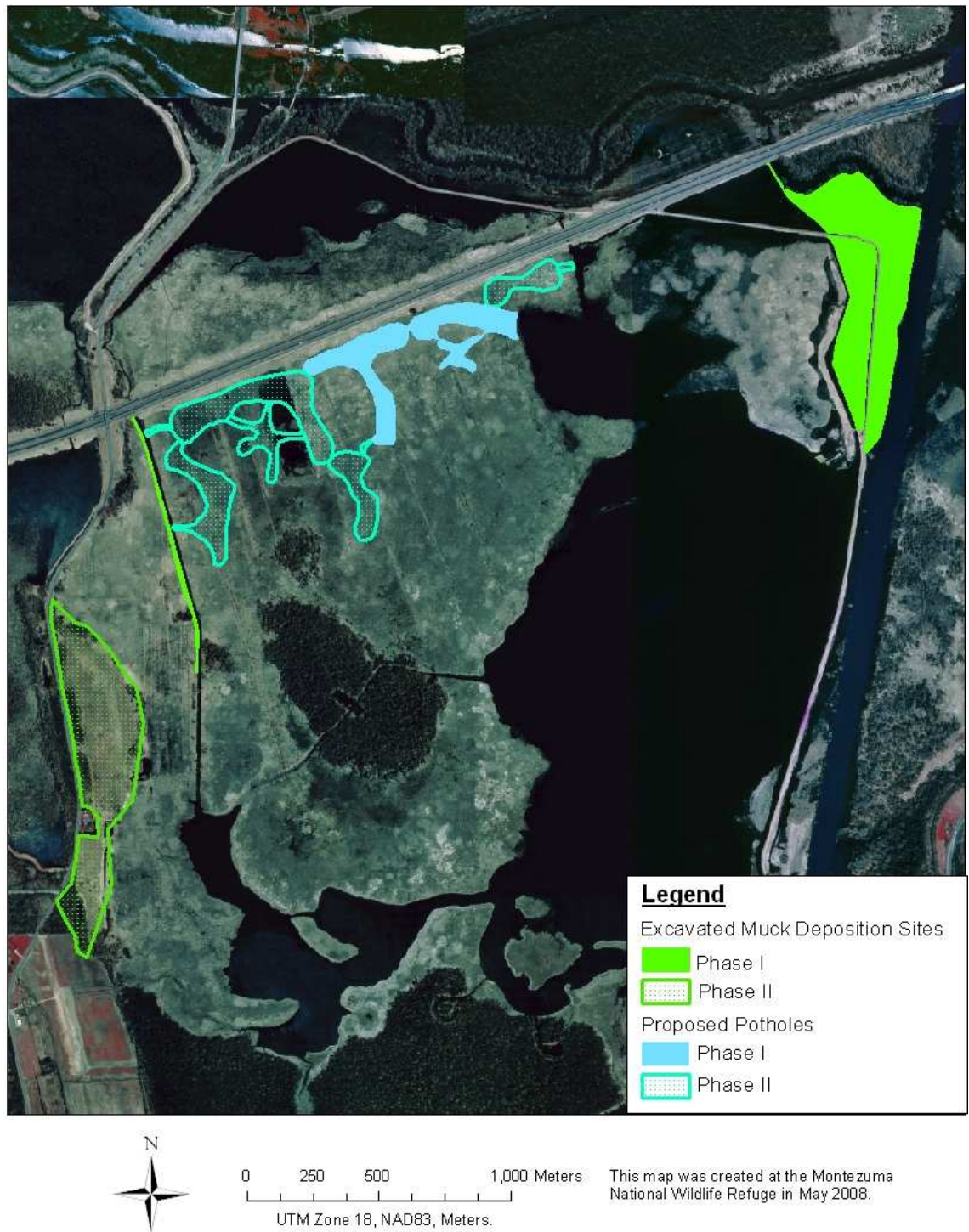
This project is being implemented to achieve the refuge's top priority habitat goal identified in the habitat management plan:

Provide high quality mudflat and freshwater emergent marsh and open water wetland habitats dominated by native plants for migrating and breeding waterfowl, shorebirds, waterbirds, marshbirds, and bald eagles provided through water level control.

Specifically, restoring the dry marsh will address habitat management objectives 1.1, 1.2, and 1.4.



Map 1 Locations of proposed potholes in the Dry Marsh portion of the Main Pool.



Map 2 Location of the proposed potholes in the Dry Marsh portion of the Main Pool and the upland fields where the excavated muck will be placed.

Objective 1.1 Emergent (Hemi-) Marsh – Migrating Waterfowl - Each year, provide a minimum of 1,000 acres of spring (March-April) and fall (Oct-Nov) waterfowl migration and staging habitat consisting of shallow flooded wetlands ($\leq 12'$) with a mix of vegetation and open water (hemi-marsh) dominated by native emergent vegetation such as millet, barnyard grass, sedges, beggarticks, spike rushes, water plantain, and smartweeds.

Objective 1.2 Shallow Water Mudflats - Provide a minimum of 100 acres of shallow water ($< 3'$) mudflats with sparse ($< 25\%$) vegetation and high invertebrate biomass in at least two patches twice annually during spring and again during late summer and early fall to benefit migrating shorebirds including semipalmated sandpipers, greater yellowlegs, and short-billed dowitcher, among other shorebirds.

Objective 1.4 Emergent Marsh – Breeding Marshbirds - Each year, provide a minimum of 800 acres of habitat for breeding marshbirds (especially black tern, pied-billed grebe, least bittern, and American bittern) consisting of an average mix of 50 - 70% vegetation and 30 – 50% open water (hemi-marsh) with an average water depth of 10-20" and at least 5 muskrat lodges per acre. Additionally, this habitat should be provided in a minimum of 3 patches > 100 acres each.

References

United State Department of Agriculture Soil Conservation Service. 1972. Soil Survey Seneca County New York. U.S. Government Printing Office. 143 pp.